



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

OFFICE OF
PREVENTION, PESTICIDES AND
TOXIC SUBSTANCES

Note to Reader

Background: As part of its effort to involve the public in the implementation of the Food Quality Protection Act of 1996 (FQPA), which is designed to ensure that the United States continues to have the safest and most abundant food supply, EPA is undertaking an effort to open public dockets on the organophosphate pesticides. These dockets will make available to all interested parties documents that were developed as part of the U.S. Environmental Protection Agency's process for making reregistration eligibility decisions and tolerance reassessments consistent with FQPA. The dockets include preliminary health assessments and, where available, ecological risk assessments conducted by EPA, rebuttals or corrections to the risk assessments submitted by chemical registrants, and the Agency's response to the registrants' submissions.

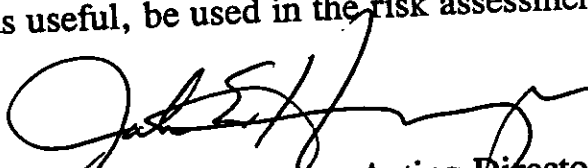
The analyses contained in this docket are preliminary in nature and represent the information available to EPA at the time they were prepared. Additional information may have been submitted to EPA which has not yet been incorporated into these analyses, and registrants or others may be developing relevant information. It's common and appropriate that new information and analyses will be used to revise and refine the evaluations contained in these dockets to make them more comprehensive and realistic. The Agency cautions against premature conclusions based on these preliminary assessments and against any use of information contained in these documents out of their full context. Throughout this process, if unacceptable risks are identified, EPA will act to reduce or eliminate the risks.

There is a 60 day comment period in which the public and all interested parties are invited to submit comments on the information in this docket. Comments should directly relate to this organophosphate and to the information and issues available in the information in this docket. Once the comment period closes, EPA will review all comments and revise the risk assessments, as necessary.

These preliminary risk assessments represent an early stage in the process by which EPA is evaluating the regulatory requirements applicable to existing pesticides. Through this opportunity for notice and comment, the Agency hopes to advance the openness and scientific soundness underpinning its decisions. This process is designed to assure that America continues to enjoy the safest and most abundant food supply. Through implementation of EPA's tolerance reassessment program under the Food Quality Protection Act, the food supply will become even safer. Leading health experts recommend that all people eat a wide variety of foods, including at least five servings of fruits and vegetables a day.

Note: This sheet is provided to help the reader understand how refined and developed the pesticide file is as of the date prepared, what if any changes have occurred recently, and what new information, if any, is expected to be included in the analysis before decisions are made. **It is not meant to be a summary of all current information regarding the chemical.** Rather, the sheet provides some context to better understand the substantive material in the docket (RED chapters, registrant rebuttals, Agency responses to rebuttals, etc.) for this pesticide.

Further, in some cases, differences may be noted between the RED chapters and the Agency's comprehensive reports on the hazard identification information and safety factors for all organophosphates. In these cases, information in the comprehensive reports is the most current and will, barring the submission of more data that the Agency finds useful, be used in the risk assessments.



Jack E. Housenger, Acting Director
Special Review and Reregistration Division

September 1, 1998

MEMORANDUM

SUBJECT: METHYL PARATHION. The HED Chapter of the Reregistration Eligibility Decision Document (RED). PC Code: 053501, Case # 818931.

FROM: Diana Locke, Toxicologist
Reregistration Branch II
Health Effects Division (7509C)

THRU: Alan Nielsen, Branch Senior Scientist
Reregistration Branch II
Health Effects Division (7509C)

TO: Mark Wilhite, Acting Chief
Reregistration Branch I
Special Review and Reregistration Division (7508W)

Attached please find an expedited review of the Human Health Assessment for the Methyl Parathion Reregistration Eligibility Decision Document (RED). The Health Effects Division (HED)'s Human Health Assessment chapter reflects new HED guidelines concerning the retention of the FQPA factor, new risk assessment guidelines, and includes the results of a dietary risk evaluation using updated (1989-1992) consumption data and the new Dietary Exposure Evaluation Model (DEEM) software. This chapter includes a summary of the product chemistry and tolerance review from Bonnie Cropp-Kohlligian, the toxicology review from Kathleen Raffaele, the DEEM runs from Rich Griffin and, the occupational and residential exposure assessment from Jonathan Becker, the drinking water exposures from Kevin Costello (EFED), as well as the risk assessment and characterization of Methyl Parathion, and data gaps. All HED discipline chapters are attached.

Please note that two changes occurred after the occupational and residential exposure assessment was completed. The first was that the FQPA Safety Factor Committee recommended that the 10X FQPA factor not be retained for occupational exposures, for all chemicals. The second was that the granular formulation will not be supported for reregistration. The HED Human Health Assessment chapter reflects these changes.

September 1, 1998

METHYL PARATHION

Executive Summary

Methyl parathion (O,O-dimethyl-O-p-nitrophenyl thiophosphate) is an acaricide and an insecticide registered for use on a variety of food and feed crops, ornamentals, and nonagricultural sites to control a number of biting or sucking pests. This restricted use pesticide is formulated as a microencapsulate (Mcap, 20.9% ai) and as an emulsifiable concentrate (EC, 11.2 to 70.74% ai). Currently, a granular formulation is available but is not being supported for reregistration. Methyl parathion is sold in the U.S. by Cheminova Agro A/S and Elf Atochem North America, the basic producers, under the trade names Methyl Parathion and Penncap-M®. Methyl parathion may be applied using aerial and ground equipment via foliar, dormant, and delayed dormant treatments. Methyl parathion is formulated with several other active ingredients including malathion, endosulfan, and parathion.

The toxicity endpoints selected for the risk assessment are based on neurotoxic effects, primarily but not exclusively, neuropathology and cholinesterase (ChE) inhibition in the brain, red blood cell, and plasma, as well as behavioral effects and systemic toxicity (decreased hematocrit and erythrocyte levels). In addition, a single exposure to methyl parathion (7.5 mg/kg) resulted in peripheral nerve demyelination (tibial and sural nerves, dorsal and ventral root fibers). Additional effects of chronic exposure include retinal degeneration and sciatic nerve degeneration. No evidence of carcinogenicity was seen in any study.

Two of the active ingredients with which methyl parathion is formulated, malathion and parathion, are also cholinesterase-inhibiting organophosphates. Experiments have shown that certain cholinesterase-inhibiting pesticides, when fed together to test animals, are more toxic than the sum of their individual toxicities when fed separately (40 CFR 180.35 Tests for Potentiation). At this time, it is unknown whether potentiation would occur following exposure to these multiple active ingredient formulations. The potential for potentiation, or any other interaction, may need

to be addressed at a later date.

An uncertainty factor (UF) of 100 was applied to the doses selected for risk assessment to account for both interspecies extrapolation and intraspecies variability. An additional factor of 10X was retained in accordance with the Food Quality Protection Act (FQPA) for the dietary risk assessment only.

The preliminary (Tier 1) acute dietary risk assessment, based on food consumption only, indicates unacceptable risk estimates for all population subgroups examined with estimates that exceed 10,000% of the acute Reference Dose (RfD). This assessment is based on an acute RfD of 0.000025 mg/kg/d and assumes exposure to upper bound ChE inhibiting residue levels of methyl parathion and methyl paraoxon based on available magnitude of the residue data. Dietary exposure is limited to only those agricultural uses of methyl parathion which are being supported under reregistration and dietary exposure estimates are refined to include available processing data.

The preliminary chronic dietary risk assessment, based on food consumption only, indicates unacceptable risk estimates for all population subgroups examined with estimates that exceed 11,000% of the chronic RfD. This Tier 2 assessment is based on a chronic RfD of 0.00002 mg/kg/d and the same dietary exposure estimates used in the acute risk dietary assessment, while incorporating percent crop treated data. The chronic dietary risk assessment indicates that the most highly exposed population is non-nursing infants < 1 year of age. Pome fruits (>5,000% RfD), primarily apple juice, stone fruits (>2,000% RfD), primarily peaches, and cereal grains (>1,000% RfD), primarily milled white rice, contribute the greatest dietary burden to the chronic risk for this age group. It should be noted that only the use of the microencapsulate formulation of methyl parathion on apples and peaches is being supported under reregistration.

Potential exposure and risk from methyl parathion and methyl paraoxon in drinking water was assessed using models and limited surface water monitoring data. The measured or modeled drinking water exposures are expected to contribute very little to the overall dietary exposure. Since, the preliminary dietary risk assessments, based on exposures from food alone, are well above HED's level of concern, aggregation of the food and drinking water exposure components was not deemed necessary at this time.

Since there are no registered residential uses, an aggregate exposure and risk assessment for methyl parathion includes consideration of exposures from dietary sources only.

The calculations of handler risk based on combined dermal and inhalation occupational exposure estimates indicate that the Margins of Exposure (MOE) are **not more than 100** even with maximum risk reduction measures (PPE and engineering controls) for all of the short- and intermediate-term scenarios assessed, except one. Many scenarios indicate MOEs less than 1. No chemical-specific handler data were submitted. Occupational exposure assessments are based on surrogate data. Overall, there is moderate to high confidence in the PHED data from which the

occupational exposures were derived. With maximum risk reduction measures applied, the only short- and intermediate-term occupational exposure scenario with a MOE **more than 100** is flagging aerial spray applications at the 0.1 lb ai/A application rate.

The surrogate rangefinding post-application assessment used the minimum and maximum application rates according to application rates found on existing labels. The resulting surrogate post-application assessment indicates that 1) **MOEs equal or exceed 100** for crops/activities with low exposure potential (dermal transfer of 500 cm²/hr) at the **23rd day** following applications at a rate of 0.1 lbs ai/A to pastures (microencapsulated and EC formulations), and 2) **MOEs equal or exceed 100** for crops/activities with high exposure potential (dermal transfer of 20,000 cm²/hr) at the **48th day** following applications at a rate of 3.0 lbs ai/A to grapes (microencapsulated formulation only). Based on the findings of the surrogate agricultural assessment, the occupational post-application risks for the EC and microencapsulated formulations are of concern. The existing labels for active registrations of EC and microencapsulated formulations allow 48 hour reentry intervals.

A review of the published incident data indicates that in outdoor agricultural situations, the primary activities associated with poisoning are application and spray drift (see Attachment 7, Review of Methyl Parathion Incident Reports, Jerome Blondell, February 5, 1998). Compared to other organophosphate and carbamate pesticides, methyl parathion is associated with less poisoning than these other pesticides when adjusted for incident per amount of use. HED believes that, to some extent, the similarity (in terms of poisonings and deaths even after adjusting for use) between methyl parathion and the more toxic ethyl parathion may have resulted in workers handling any product with the “parathion” name with greater care. Illegal interior home use of methyl parathion resulted in deaths in two separate incidents in Mississippi. Food or water contamination and an unusually high concentration used in the application probably contributed to these deaths. Additional reported cases in Ohio, Mississippi, and Louisiana have not been well documented or confirmed with ChE level testing.

Hazard Characterization

A. Hazard Profile

The toxicological database is complete pending submission of a developmental neurotoxicity study. In summary, methyl parathion is acutely toxic (category 1) for oral, dermal, and inhalation toxicity, is moderately-slightly irritating to the eyes and skin, and is not a dermal sensitizer. The toxicity endpoints selected for the risk assessment are based on neurotoxic effects, primarily but not exclusively, neuropathology and cholinesterase (ChE) inhibition in the brain, red blood cell, and plasma, as well as behavioral effects and systemic toxicity. In addition, a single exposure to methyl parathion (7.5 mg/kg) in rodents results in peripheral nerve demyelination (tibial and sural nerves, dorsal and ventral root fibers). Chronic exposure at a dose level of 2.21 mg/kg/d results in retinal degeneration and sciatic nerve degeneration. There are no notable

differences in sensitivity to methyl parathion between male and female animals. No evidence of carcinogenicity was seen in any study. Methyl parathion is classified as a "Group E," indicating no evidence of carcinogenicity in humans; i.e., the chemical is characterized as "Not Likely" to be carcinogenic in humans via relevant routes of exposure. This classification is supported by the lack of mutagenic activity.

The following table summarizes the acute toxicity data for the technical methyl parathion.

Guideline No.	Study Type	MRID #	Results	Toxicity Category
81-1	Acute Oral (rat)		LD ₅₀ = 4.5-24 mg/kg	I
81-2	Acute Dermal (rat)		LD ₅₀ = 6 mg/kg	I
81-3	Acute Inhalation (rat)	256961	LC ₅₀ < 0.163 mg/L	I
81-4	Primary Eye Irritation	256966, 405426-02	Irritation clear by 7 days	III
81-5	Primary Skin Irritation	256962	Max. score = 2.0; 72 h = 0.5	IV
81-6	Dermal Sensitization	256963	Negative	
81-8	Acute Neurotoxicity Delayed Hen	416068-01	Negative	

No dermal absorption study was available. Although there was a 21-day dermal study in rabbits available, it was not selected to generate a dermal toxicity endpoint for the following reasons: 1) The rabbit is less sensitive than the rat to this chemical (for example, in the rabbit developmental study, the 3.0 mg/kg dose resulted in only minimally significant ChE inhibition); 2) several endpoints (including neurotoxicity and neuropathology) occurring at low doses in the acute oral study were not measured in the dermal study; 3) oral and dermal effects seen in other acute studies occurred at similar doses [see Attachment 1, Acute Toxicity Endpoints in Methyl Parathion (O,O-dimethyl O-p-nitrophenyl phosphorothioate): Hazard Identification Committee Report (George Ghali, 12/01/97)], so there is no reason to believe that neurotoxic effects might not occur at low dermal doses, and 4) because of physiological and biochemical factors, unique to the rabbit, which might result in an underestimation of the dermal toxicity of organophosphorus pesticides belonging to the thiophosphate subgroup (R. Zendzian, HED, memo dated March 1997). For risk assessment purposes the dermal absorption rate was assumed to be 100%.

B. Endpoint Selection

METHYL PARATHION ENDPOINTS				
Exposure Duration	Exposure Route	Endpoint		Comments
		Dose	Effect	
Acute - RfD	Dietary	RfD = 0.000025 mg/kg/d	Neuropathology, behavioral effects, & inhibition of brain, plasma, & red blood cell (RBC) cholinesterase (ChE)	NOEL = 0.025 mg/kg/d. Based on neurotoxicity, neuropathology & inhibition of brain, plasma, and RBC ChE occurring at 7.5 mg/kg/d. Acute neurotoxicity study by gavage in rats with effects seen after one dose. Uncertainty factor (UF) of 100 applied for intra & inter species differences & an additional safety factor of 10X retained by the FQPA Safety Factor Committee for FQPA.
Chronic - RfD	Dietary	RfD = 0.00002 mg/kg/d	Systemic toxicity, neuropathology, & inhibition of RBC ChE at the LOEL	NOEL = 0.02 mg/kg/d. Based on systemic toxicity, neuropathology, & RBC ChE inhibition occurring at 0.21 mg/kg/d. Inhibition of plasma and brain ChE occurred at higher doses. Retinal degeneration and clinical signs occurred at the highest dose. 2-Yr chronic feeding study in rats. UF of 100 applied for intra & inter species differences & an additional safety factor of 10X retained by the FQPA Safety Factor Committee for FQPA.
Short-term (1-7 days) Occupational	Dermal	NOEL = 0.025 mg/kg/d	Neuropathology, behavioral effects, & inhibition of brain, plasma, & RBC ChE	Same endpoint as Acute RfD. Although a 21-day dermal study in the rabbit is available, it was not selected. See Hazard ID SARC memo 12/01/97. Dermal absorption rate assumed to be 100%. UF of 100 applied for intra & inter species differences.
Intermediate-term (7 - 90 days) Occupational	Dermal	NOEL = 0.02 mg/kg/d	Systemic toxicity, neuropathology, & inhibition of RBC ChE at the LOEL	Same endpoint as Chronic RfD. Long term dermal study not available. Dermal absorption rate assumed to be 100%. UF of 100 applied for intra & inter species differences.
Chronic (>several months) Occupational	Dermal	NOEL = 0.02 mg/kg/d	Systemic toxicity, neuropathology, & inhibition of RBC ChE at the LOEL	Same endpoint as Chronic RfD. Long term dermal study not available. Dermal absorption rate assumed to be 100%. UF of 100 applied for intra & inter species differences.

All Durations Occupational	Inhalation	NOEL = 0.02 mg/kg/d	Systemic toxicity, neuropathology, & inhibition of RBC ChE at the LOEL	Same endpoint as Chronic RfD. Due to high toxicity seen in acute inhalation study, 100% absorption is assumed. UF of 100 applied for intra & inter species differences.
-------------------------------	------------	---------------------------	---	--

C. FQPA Considerations

The submitted data (see Attachment 2, Toxicology Chapter, Kathleen Raffaele, March 10, 1998) included an acceptable 2-generation reproduction study in rats and acceptable prenatal developmental toxicity studies in rats and rabbits. The submitted data provided no indication of increased sensitivity of rats or rabbits to *in utero* and/or postnatal exposure to methyl parathion. Although delayed neuropathy was not observed in a study in hens, a single-dose acute neurotoxicity study in rats demonstrated neuropathology at a relatively low dose (7.5 mg/kg/d). Also, there is evidence of the developmental neurotoxic potential of methyl parathion in the open literature. HED is requiring a developmental neurotoxicity study. In the absence of this study, substantial uncertainties remain regarding the effect of methyl parathion on functional development.

Although differential sensitivity to young animals was not revealed in the submitted data, qualitative evidence of increased sensitivity to perinatal rats has been identified in the open literature (see Attachment 2). The evidence of increased sensitivity cannot be quantified.

The Hazard ID SARC determined that for methyl parathion, the 10-fold uncertainty factor for the protection of infants and children is appropriate (12/01/97). When the FQPA Safety Factor Committee revisited all the organophosphates in June 1998, it was again determined that a 10-fold uncertainty factor for the protection of infants and children should be retained.

Exposure Characterization

A. Registered Uses

Methyl parathion is registered for use on a variety of fruits, vegetables, and field crops [see Table A, pages 13-24, in Attachment 3, Residue Chemistry Chapter for the Methyl Parathion Reregistration Eligibility Decision (RED) Document, Bonnie Cropp-Kohlligian, June 11, 1998]. Methyl parathion is sold in the U.S. by Cheminova Agro A/S and Elf Atochem North America, the basic producers, under the trade names Methyl Parathion and Penncap-M®. Formulations registered by the basic producers for use on food/feed crops include microencapsulate and emulsifiable concentrate formulations. A granular formulation is available but is not being supported in reregistration. Methyl parathion may be applied using aerial and ground equipment via foliar, dormant, and delayed dormant treatments. Multiple Active Ingredient (MAI) formulations of methyl parathion are registered in combination with parathion, endosulfan, or

malathion.

B. Dietary Exposure

Food Exposure

The HED Metabolism Assessment Review Committee [see Attachment 4, Methyl Parathion (053501), Bonnie Cropp-Kohlligian, May 21, 1998] has tentatively concluded that methyl parathion residues of concern in plant commodities include methyl parathion, methyl paraoxon, and *p*-nitrophenol, and that methyl parathion residues of concern in animal commodities include methyl parathion, methyl paraoxon, *p*-nitrophenol, and amino-paraoxon-methyl. The tolerance expression for plant and animal commodities may be based on methyl parathion only (U.S. tolerance definition will be compatible with Codex). The methyl parathion residues of concern for plant and animal commodities to be included in the risk assessment are based on ChE inhibition, and will include methyl parathion and its oxon metabolite, methyl paraoxon. Residues of *p*-nitrophenol do not have to be included in the tolerance expression or considered in the aggregate risk assessment for methyl parathion with respect to cholinesterase inhibition, but should be considered in conjunction with the cumulative risk assessment for *p*-nitrophenol. There is concern for the amino-paraoxon-methyl metabolite due to neuropathy of unknown etiology. Once outstanding livestock feeding studies have been submitted, the Agency will determine how to include amino-paraoxon-methyl metabolite in the risk assessment.

Tolerances for residues of methyl parathion have been established on a variety of fruit, vegetable, and field crops. Two acceptable plant metabolism studies were submitted in support of the reregistration of methyl parathion; however, an additional plant metabolism study is outstanding. Additional magnitude of the residue and processing data remain outstanding. Anticipated residue (AR) estimates of methyl parathion and methyl paraoxon in/on plant commodities and processed commodities have been included in the dietary risk assessment for methyl parathion. Anticipated residue estimates are upper bound residue estimates based on available magnitude of the residue data. These estimates have been refined to include concentration/reduction factors determined from available processing data.

No tolerances for residues of methyl parathion have been established in animal commodities, although tolerances for residues of methyl parathion have been established on numerous animal feed items. The appropriate tolerances for methyl parathion residues in animal commodities will be determined once data are available from outstanding livestock feeding studies.

A dietary exposure assessment for methyl parathion residues of concern from animal commodities was not performed at this time since no tolerances are currently established for residues of methyl parathion in meat, milk, poultry, and eggs. Residues of methyl parathion were not detected in ruminant tissue, milk, and egg samples collected from the ruminant and poultry

metabolism studies. Residues of methyl paraoxon were also not detected in any of the samples collected from the ruminant and poultry metabolism studies. Residues of methyl parathion detected in poultry tissue samples collected from the poultry metabolism study were very low (0.001 ppm in heart and kidney; 0.004 ppm in gizzard; 0.008 ppm in fat; and 0.011 ppm in skin). Based on available data, it is uncertain if finite residues of methyl parathion and methyl paraoxon are likely to occur in animal commodities; hence, anticipated residue estimates for residues of methyl parathion and methyl paraoxon in animal commodities have not been included in the dietary risk assessment for methyl parathion at this time.

Drinking Water Exposure

Potential exposure and risk from methyl parathion in drinking water was assessed using models and limited monitoring data. The Tier 1 ground water exposure assessment was derived from the SCI-GROW screening model only, with no refinements. Without ground water monitoring data, no refinements (Tier 2) can be made. The Tier 2 surface water exposure assessment was derived from the PRZMS3 model, which simulates the erosion and runoff from an agricultural field, and the EXAMS model, which simulates fate in a surface water body.

For the Tier 2 surface water analysis, nine scenarios were chosen; sweet potatoes in Louisiana, potatoes in Maine, pecans in Georgia, corn in Ohio, grapes in New York, peaches in Georgia, cotton in Mississippi, cherries in Wisconsin, and alfalfa in Oregon. The scenarios chosen are frequently used by the Environmental Fate and Effects Division (EFED) to represent sites expected to produce runoff at greater than 90% of the sites where the appropriate crop is grown. Model simulations were made with the maximum application rates, maximum number of yearly applications, and the shortest recommended application interval. In addition, USGS monitoring data from two targeted studies were also available on cotton in Mississippi and rice in California. The monitoring studies contain 80 samples (each), taken over the course of one year and are considered reliable.

The monitoring data on cotton in Mississippi showed “no detects” for an entire year. The monitoring data on rice in California are derived from a study that was conducted after mitigation measures were put into place in the 1980s to prevent pesticide run-off. The mitigation measures include 1) a holding pond for the water prior to release to allow for degradation, and 2) a set-back area by the rice fields. The peak value of 0.12 ppb is lower than 1-2 ppb of previous years which is reflective of the effectiveness of the mitigation practices (assuming application rates and crops/sites stayed constant), and is lower than even the mean values from any of the models, which shows that the modeled Tier 2 analysis for methyl parathion may be conservative.

Since preliminary dietary exposure estimates from food alone result in risk estimates above HED’s level of concern, no Drinking Water Levels of Concern (DWLOC) were calculated. It should be noted however, that the measured or modeled drinking water exposures are expected to contribute very little to the overall dietary burden.

C. Non-Dietary Exposure

Occupational

Methyl parathion can be applied with aerial equipment, airblast sprayer, chemigation, and groundboom sprayer. Application rates range from 0.1 to 3 pounds active ingredient per acre depending upon the application scenario and crop. EPA has determined that there are potential exposures to mixers, loaders, applicators, and other handlers during usual use-patterns associated with methyl parathion.

No chemical-specific handler data were submitted. Due to a lack of scenario-specific data, HED calculated unit exposure values using generic data from the Pesticide Handler Exposure Database (PHED Version 1.1) and protection factors that are applied to represent various risk mitigation options (i.e., the use of PPE and engineering controls). PHED data were not available for microencapsulated formulations; therefore, PHED data for liquid formulations were used as a surrogate. See Tables 1-4, pages 8-17, in the attached Occupational and Residential Exposure Assessment and Recommendations for the Reregistration Eligibility Decision Document for Methyl Parathion (Jonathan Becker, March 2, 1998).

Occupational Post-Application

Chemical-specific post-application exposure and/or environmental fate data have not yet been submitted by the registrant in support of reregistration of any formulation type of methyl parathion. In lieu of these data, a surrogate rangefinder post-application assessment was conducted to determine potential risks for the representative crops used for the handler exposure assessment. The surrogate assessment is based on the minimum and maximum application rates of 0.1 lb ai/A for pastures and 3.0 lb ai/A for grapes.

Residential

At this time, products containing methyl parathion are intended for occupational uses only. Methyl parathion is a restricted-use pesticide and is only available for retail sale to, and for use by, certified applicators (or persons under their direct supervision) and only for those uses covered by the certified applicator's certification. There are no residential uses by commercial applicators except that currently, methyl parathion could potentially be applied by commercial applicators (PCO) to fruit trees in residential settings. While HED believes that this occurs infrequently, this scenario would result in excessive risk to homeowners, including children, from post-application exposures to methyl parathion. HED believes that all uses of methyl parathion around residences should be prohibited and that all methyl parathion labels should be amended to reflect this restriction.

Risk Assessment/Characterization

An uncertainty factor (UF) of 100 was applied to the risk assessment to account for both interspecies extrapolation and intraspecies variability. An additional factor of 10X was retained in accordance with the FQPA for the dietary risk assessment only. Because of this Hazard ID SARC and FQPA Safety Factor Committee recommendation, an UF of 1000 was applied to determine the chronic RfD, and the acute dietary RfD (FQPA Safety Factor Recommendations for the Organophosphates - Combined Report of the Hazard Identification Assessment Review Committee and the FQPA Safety Factor Committee, August 6, 1998). An MOE of ≥ 100 is needed in the occupational exposure risk assessment since the Agency does not consider it appropriate to apply the FQPA Safety Factor to occupationally exposed workers (Special Report of the FQPA Safety Factor Committee, April 15, 1998).

Dietary

The *Dietary Exposure Evaluation Model (DEEM)*, based on 1989-92 USDA food consumption data, was used to estimate the acute and chronic dietary risk for methyl parathion. DEEM replaces the Dietary Risk Evaluation System (DRES) program which is based on 1977-78 food consumption data. The current DEEM model, like DRES, calculates exposures based on single-day (rather than single-serving) consumption data.

The acute (single-day) dietary risk assessment is a Tier 1 (upper end) estimate based on an acute RfD of 0.000025 mg/kg/d and available magnitude of the residue data, including available processing data, and assumes that methyl parathion residues of concern found in each commodity result from the maximum use rate of methyl parathion. However, exposure is limited to only those agricultural uses of methyl parathion which are being supported under reregistration. Percent crop treated information is not taken into consideration. The preliminary acute dietary risk assessment, based on food consumption only, and the above upper end assumptions, provides acute risk estimates that exceed 10,000% of the acute RfD.

The chronic dietary risk assessment, which used the same dietary exposure estimates based on magnitude of the residue data, is refined to include percent crop treated information. The preliminary chronic dietary risk assessment, based on food consumption only, provides chronic dietary risk estimates as high as >11,000% of the chronic RfD. The most highly exposed population is non-nursing infants < 1 year of age. Pome fruits (> 5,000% RfD), primarily apple juice, stone fruits (> 2,000% RfD), primarily peaches, and cereal grains (>1,000% RfD), primarily milled white rice, contribute the greatest dietary burden to the chronic risk for this age group. The calculated risks are based upon a chronic RfD = 0.00002 mg/kg/d.

DIETARY RISK (FOOD ONLY)		
Population	Acute	Chronic
U.S. Population	>10,000 % RfD	>2,000 % RfD

Non-nursing infants < 1 yr	>10,000 % RfD	>11,000 % RfD
All infants < 1 yr	>10,000 % RfD	>10,000 % RfD

The dietary risk to adults and children based on exposures from food alone are above HED's level of concern. Any aggregation of the food and drinking water exposure components only serves to raise the preliminary risk estimate even more above HED's level of concern.

Occupational

Although there was a 21-day dermal toxicity study in the rabbit available, it was not considered acceptable to generate a dermal endpoint. Therefore, the Hazard ID SARC recommended that both the dermal and inhalation exposures be converted to an equivalent oral dose, combined as a total dose, and compared to an oral endpoint. Both the dermal and inhalation endpoints for occupational exposures were derived from oral studies. As no dermal absorption study was available, the default value of 100% was used. Inhalation absorption was also assumed to be 100%.

The calculations of risk based on combined dermal and inhalation occupational exposures indicate that the MOEs are **not more than 100** even with maximum risk reduction measures (PPE and engineering controls) for all of the short- and intermediate-term scenarios assessed, except one. Many scenarios indicate MOEs less than 1. Overall, there is moderate to high confidence in the PHED data from which the occupational exposures were derived. See Tables 1-4 from the Occupational and Residential Exposure Assessment and Recommendations for the Reregistration Eligibility Decision Document for Methyl Parathion (Jonathan Becker, March 2, 1998), attached.

With maximum risk reduction measures applied, the only short- and intermediate-term occupational exposure scenario that has a MOE **greater than 100** is flagging aerial spray applications at the 0.1 lb ai/A application rate.

The surrogate rangefinder post-application assessment measured the minimum and maximum application rates for the use of methyl parathion according to application rates found on the existing labels. The surrogate assessment used a typical transfer coefficient (Tc) for relatively low post-application exposure to workers (i.e., Tc = 500 cm²/hr), from activities such as hoeing, and high post-application exposure to workers (i.e., Tc = 20,000 cm²/hr), from activities such as girdling of grapes.

The resulting surrogate post-application assessment indicates that 1) **MOEs equal or exceed 100** for crops/activities with low potential exposure (dermal transfer of 500 cm²/hr) at the 23rd day following applications at a rate of 0.1 lbs ai/A to pastures (EC and microencapsulate), and 2) **MOEs equal or exceed 100** for crops/activities with high potential exposure (dermal transfer of 20,000 cm²/hr) at the 48th day following applications at a rate of 3.0 lbs ai/A to grapes (microencapsulate only). Based on the findings of the surrogate agricultural assessment, the occupational post-application risks for the EC and microencapsulated formulations are of

concern. Presently, the existing labels for active registrations of EC and microencapsulated formulations allow 48 hour reentry intervals.

Since there are no residential uses, an aggregate exposure and risk assessment for methyl parathion includes consideration of exposures from food and water only.

Data Needs

1. Developmental neurotoxicity study.
2. Data needs for the tolerance reassessment and dietary risk assessment are detailed in Table B, pages 25-45, found in the attached Residue Chemistry Chapter for the Methyl Parathion Reregistration Eligibility Decision (RED) Document (June 11, 1998). They are summarized as the following:
 - a) A new lettuce metabolism study is required.
 - b) Additional data are required to validate the experimental methods for the poultry and ruminant metabolism studies.
 - c) An independent laboratory validation of the proposed enforcement method is required.
 - d) Data depicting the storage stability of methyl parathion residues of concern in/on a representative fruit are required.
 - e) Field trial data are required on the following crop/commodities: aspirated grain fractions, alfalfa, almonds, apples, beans (succulent and dried), cherries, cottonseed, cotton gin byproducts, grass, hops, onions, peanuts, pears, pecans, plums, potatoes, rice straw, rape forage, sorghum, soybeans, sweet potatoes, sugar beet tops, turnip tops, and wheat. Moreover, field trial data required on the following raw agricultural commodities are deemed critical to tolerance reassessment: aspirated grain fractions, alfalfa forage, alfalfa hay, alfalfa seed, almonds, almond hulls, cherries, cotton gin byproducts, cowpea forage, grass forage, grass hay, hops, peanuts, pears, pecans, plums, rape forage, sorghum grain, sorghum stover, sorghum forage, soybeans, soybean forage, and soybean hay.
 - f) Processing studies on peanuts, plums/prunes, and sunflower seed are required.
 - g) Ruminant and poultry feeding studies are required.
3. The occupational handler risks for all but one exposure scenario are of concern. Specific exposure studies and data needs will be addressed after risk/risk mitigation concerns are addressed.

4. The occupational post-application risks for the EC and microencapsulated formulations are of concern. Specific post-application exposure studies and data needs will be addressed after risk/risk mitigation concerns are addressed.

5. Ground water monitoring data.

Attachments:

- Attachment 1 - Methyl Parathion (O,O-dimethyl O-p-nitrophenyl phosphorothioate): Hazard Identification Committee Report (George Ghali, December 1, 1997)
- Attachment 2 - Toxicology Chapter (Kathleen Raffaele, March 10, 1998)
- Attachment 3 - Residue Chemistry Chapter for the Methyl Parathion Reregistration Eligibility Decision (RED) Document (Bonnie Cropp-Kohlligian, June 11, 1998)
- Attachment 4 - Methyl Parathion (053501). The Outcome of the HED Metabolism Assessment Review Committee Meeting Held on March 11, 1998 (Bonnie Cropp-Kohlligian, May 21, 1998)
- Attachment 5 - DEEM Results (Richard Griffin, August 11, 1998)
- Attachment 6 - Occupational and Residential Exposure Assessment and Recommendations for the Reregistration Eligibility Decision Document for Methyl Parathion (Jonathan Becker, March 2, 1998)
- Attachment 7 - Review of Methyl Parathion Incident Reports (Jerome Blondell/Monica Spann, February 5, 1998)

Filename: D:\053501cr.R91

Chemical Name: methyl parathion

RfD(Chronic): .000020 mg/kg/DAY

NOEL(Chronic): .020000 mg/kg/day

RfD(Acute): .000025 mg/kg/DAY

NOEL(Acute): .025000 mg/kg/day

Q*=.0000

Date created/last modified: 08-11-1998/11:20:46/8

Program ver. 6.16

Food Code	Crop Grp	Food Name	RESIDUE (ppm)	RDF #	Adj. Factors #1	#2	Comment
013	A	GRAPES	003.000000		01.000	00.060	
014	A	GRAPES-RAISINS	000.120000		01.000	00.060	
015	A	GRAPES-JUICE	000.090000		01.000	00.060	
040	R	ALMONDS	000.100000		01.000	00.010	
047	R	PECANS	000.100000		01.000	00.010	
048	R	WALNUTS	000.100000		01.000	00.010	
052	L	APPLES	001.000000		01.000	00.200	
053	L	APPLES-DRIED	001.000000		08.000	00.200	
054	L	APPLES-JUICE/CIDER	000.100000		01.000	00.200	
056	L	PEARS	001.000000		01.000	00.070	
057	L	PEARS-DRIED	001.000000		06.250	00.070	
061	M	CHERRIES	001.000000		01.000	00.110	
062	M	CHERRIES-DRIED	001.000000		04.000	00.110	
063	M	CHERRIES-JUICE	001.000000		01.500	00.110	
064	M	NECTARINES	001.000000		01.000	00.170	
065	M	PEACHES	001.000000		01.000	00.460	
066	M	PEACHES-DRIED	001.000000		07.000	00.460	
067	M	PLUMS(DAMSONS)	001.000000		01.000	00.150	
068	M	PLUMS-PRUNES(DRIED)	001.000000		05.000	00.150	
069	M	PLUMS/PRUNE-JUICE	001.000000		01.400	00.150	
125	A	HOPS	001.000000		01.000	01.000	
159	I	TOMATOES-WHOLE	000.500000		01.000	00.010	
160	I	TOMATOES-JUICE	000.030000		01.000	00.010	
161	I	TOMATOES-PUREE	000.060000		01.000	00.010	
162	I	TOMATOES-PASTE	000.060000		01.000	00.010	
163	I	TOMATOES-CATSUP	000.030000		01.000	00.010	
166	E	CELERY	005.000000		01.000	00.080	
168	F	BROCCOLI	001.000000		01.000	00.020	
169	F	BRUSSELS SPROUTS	001.000000		01.000	00.020	
170	F	CABBAGE-GREEN AND RED	001.000000		01.000	00.020	
171	F	CAULIFLOWER	001.000000		01.000	00.020	
172	F	COLLARDS	001.000000		01.000	00.020	
173	F	CABBAGE-CHINESE/CELERY/BOK CHO	001.000000		01.000	00.020	
174	F	KALE	001.000000		01.000	01.000	
175	F	KOHLRABI	001.000000		01.000	01.000	
176	E	LETTUCE-LEAFY VARIETIES	002.000000		01.000	00.010	
181	A	ARTICHOKES-GLOBE	002.000000		01.000	01.000	
182	E	LETTUCE-UNSPECIFIED	002.000000		01.000	00.010	
183	F	MUSTARD GREENS	001.000000		01.000	00.020	
186	E	SPINACH	000.500000		01.000	00.080	
188	C	TURNIPS-TOPS	004.000000		01.000	00.060	
192	E	LETTUCE-HEAD VARIETIES	002.000000		01.000	00.010	
198	B	CARROTS	001.000000		01.000	00.060	
205	D	ONIONS-DRY-BULB (CIPOLLINI)	001.000000		01.000	00.090	
206	D	ONIONS-DEHYDRATED OR DRIED	001.000000		09.000	00.090	
207	B	POTATOES/WHITE-WHOLE	000.100000		01.000	00.010	
208	B	POTATOES/WHITE-UNSPECIFIED	000.100000		01.000	00.010	
209	B	POTATOES/WHITE-PEELED	000.100000		01.000	00.010	
210	B	POTATOES/WHITE-DRY	000.100000		06.500	00.010	
211	B	POTATOES/WHITE-PEEL ONLY	000.100000		01.000	00.010	
218	B	SWEET POTATOES (INCL YAMS)	000.100000		01.000	01.000	
219	B	TURNIPS-ROOTS	000.100000		01.000	00.060	
227	G	BEANS-DRY-GREAT NORTHERN	000.100000		01.000	00.020	
228	G	BEANS-DRY-KIDNEY	000.100000		01.000	00.020	
229	G	BEANS-DRY-LIMA	000.100000		01.000	00.020	
230	G	BEANS-DRY-NAVY (PEA)	000.100000		01.000	00.020	
231	G	BEANS-DRY-OTHER	000.100000		01.000	00.020	
232	G	BEANS-DRY-PINTO	000.100000		01.000	00.020	
233	G	BEANS-SUCCULENT-LIMA.	001.000000		01.000	00.030	
234	G	BEANS-SUCCULENT-GREEN	001.000000		01.000	00.030	
235	G	BEANS-SUCCULENT-OTHER	001.000000		01.000	00.030	
236	G	BEANS-SUCCULENT-YELLOW/WAX	001.000000		01.000	00.030	
237	0	CORN/POP	000.200000		01.000	00.010	
238	0	CORN/SWEET	000.200000		01.000	00.010	
240	G	PEAS (GARDEN)-DRY	000.500000		01.000	00.020	
241	G	PEAS (GARDEN)-GREEN	001.000000		01.000	00.030	

243	G	LENTILS	000.100000	01.000	00.020
244	G	MUNG BEANS (SPROUTS)	001.000000	01.000	00.030
249	G	BEANS-DRY-BROADBEANS	000.100000	01.000	00.020
250	G	BEANS-SUCCULENT-BROADBEANS	001.000000	01.000	00.030
251	G	BEANS-DRY-PIGEON BEANS	000.100000	01.000	00.020
253	G	BEANS-UNSPECIFIED	001.000000	01.000	00.030
256	G	BEANS-DRY-HYACINTH	000.100000	01.000	00.020
257	G	BEANS-SUCCULENT-HYACINTH	001.000000	01.000	00.030
258	G	BEANS-DRY-BLACK EYE PEAS/COWPEA	000.100000	01.000	00.020
259	G	BEANS-DRY-GARBANZO/CHICK PEA	000.100000	01.000	00.020
262	D	ONIONS-GREEN	001.000000	01.000	00.090
265	O	BARLEY	004.000000	01.000	00.010
266	O	CORN GRAIN-ENDOSPERM	000.200000	01.000	00.010
267	O	CORN GRAIN-BRAN	000.200000	01.000	00.010
268	O	CORN GRAIN/SUGAR/HFCS	000.200000	01.500	00.010
269	O	OATS	004.000000	01.000	00.010
270	O	RICE-ROUGH (BROWN)	003.000000	01.000	00.080
271	O	RICE-MILLED (WHITE)	003.000000	01.000	00.080
275	O	SORGHUM (INCLUDING MILO)	000.100000	01.000	00.010
276	O	WHEAT-ROUGH	004.000000	01.000	00.010
277	O	WHEAT-GERM	008.000000	01.000	00.010
278	O	WHEAT-BRAN	008.000000	01.000	00.010
279	O	WHEAT-FLOUR	001.600000	01.000	00.010
282	B	SUGAR-BEET	000.100000	01.000	00.010
289	O	CORN GRAIN-OIL	000.200000	01.000	00.010
290	A	COTTONSEED-OIL	003.000000	01.000	00.120
291	A	COTTONSEED-MEAL	001.000000	01.000	00.120
293	A	PEANUTS-OIL	001.000000	01.000	00.010
297	G	SOYBEANS-OIL	000.300000	01.000	00.010
298	A	SUNFLOWER-OIL	000.200000	01.000	00.010
301	A	CANOLA OIL (RAPE SEED OIL)	000.200000	01.000	00.020
303	G	SOYBEAN-OTHER	000.100000	01.000	00.010
304	G	SOYBEANS-MATURE SEEDS DRY	000.100000	01.000	00.010
305	G	SOYBEANS-FLOUR (FULL FAT)	000.100000	01.000	00.010
306	G	SOYBEANS-FLOUR (LOW FAT)	000.100000	01.000	00.010
307	G	SOYBEANS-FLOUR (DEFATTED)	000.100000	01.000	00.010
315	A	GRAPES-WINE AND SHERRY	003.000000	01.000	00.060
377	L	APPLES-JUICE-CONCENTRATE	001.000000	03.900	00.200
384	E	CELERY JUICE	005.000000	01.000	00.080
388	O	CORN GRAIN/SUGAR-MOLASSES	000.200000	01.500	00.010
392	A	GRAPES-JUICE-CONCENTRATE	000.090000	03.600	00.060
399	O	OATS-BRAN	008.000000	01.000	01.000
402	M	PEACHES-JUICE	001.000000	01.000	00.460
403	A	PEANUTS-BUTTER	001.000000	01.890	00.010
404	L	PEARS-JUICE	001.000000	01.000	00.070
405	G	PEAS-SUCCUL./BLACK EYE/COWPEA	001.000000	01.000	00.030
408	O	RICE-BRAN	003.000000	01.000	00.080
417	A	SUNFLOWER-SEEDS	000.200000	01.000	00.010
423	I	TOMATOES-DRIED	000.500000	14.300	00.010
431	R	WALNUT OIL	000.100000	01.000	00.010
437	O	WHEAT-GERM OIL	008.000000	01.000	00.010
482	A	SOYBEANS-PROTEIN ISOLATE	000.100000	01.000	00.010
940	A	PEANUTS-HULLED	001.000000	01.000	00.010

U.S. Environmental Protection Agency
DEEM89N CHRONIC analysis for METHYL PARATHION
Residue file name: 053501CR
Analysis Date 08-11-1998
Reference dose (RfD, CHRONIC) =

Ver. 6.12
(1989-92 data)
Adjustment factor #2 used.
Residue file dated: 08-11-1998/11:20:46/8

0.000020 mg/kg body-wt/day

Total exposure by population subgroup

Population Subgroup	Total Exposure	
	mg/kg body wt/day	Percent of Rfd
-----	-----	-----
U.S. Pop - 48 states - all seasons	0.000455	2,274.9%
U.S. Population - spring season	0.000419	2,092.6%
U.S. Population - summer season	0.000447	2,233.3%
U.S. Population - autumn season	0.000486	2,428.2%
U.S. Population - winter season	0.000467	2,332.6%
Northeast region	0.000509	2,543.4%
Midwest region	0.000419	2,095.1%
Southern region	0.000399	1,993.9%
Western region	0.000539	2,693.2%
Pacific Region	0.000591	2,954.7%
Hispanics	0.000445	2,224.6%
Non-hispanic whites	0.000455	2,273.35%
Non-hispanic blacks	0.000419	2,095.5%
Non-hispanic other than black or white	0.000669	3,342.8%
All infants ki year)	0.002006	10,028.1%
Nursing infants (<1 year)	0.001197	5,985.6%
Non-nursing.infants (<1 year)	0.002346	11,729.5%
Children (1-6 years)	0.001004	5,021.0%
Children (7-12 years)	0.000625	3,125.0%
Females (13-19 yrs/not preg. or nursing)	0.000270	1,352.2%
Females (20+ years/not preg. or nursing)	0.000365	1,824.4%
Females (13-50 years)	0.000320	1,601.5%
Females (13+/pregnant/not nursing)	0.000330	1,650.1%
Females (13+/nursing)	0.000500	2,498.1%
Males (13-19 years)	0.000286	1,430.0%
Males (20+ years)	0.000332	1,662.2%
Seniors (55+)	0.000429	2,144.2%
-----	-----	-----

U.S. Environmental Protection Agency
 DEEM89N CHRONIC analysis for METHYL PARATHION

Residue file name: 053501CR

Analysis Date 08-11-1998

Reference dose (RfD, CHRONIC) = 0.000020 mg/kg body-wt/day

Ver. 6.12

(1989-92 data)

Adjustment factor #2 used.

Residue file dated: 08-11-1998/11:20:46/8

Critical Commodity Contribution Analysis for
 U.S. Pop - 48 states - all seasons

Total Exposure = 0.0004550 mg/kg-body wt/DAY

Crop groups with total exposure contribution > 10%

Foods/Foodforms with exposure contribution > 10%

Crop group Food Foodform	----- Exposure Analysis -----		
	mg/kg body wt/day	% of Total Exposure	Percent of RfD
-----	-----	-----	-----
GROUP UNSPECIFIED			
Total for crop group	0.0000495	10.870%	247.35%
POME FRUITS			
APPLES	0.0000884	19.440%	442.20%
-----	-----	-----	-----
Total for crop group	0.0001239	27.24%	619.5806
STONE FRUITS			
PEACHES	0.0000582	12.800%	291.15%
-----	-----	-----	-----
Total for crop group	0.0000741	16.30%	370.73%
CEREAL GRAINS			
RICE-MILLED (WHITE)	0.0000495	10.88%	247.53%
-----	-----	-----	-----
Total for crop group	0.0001233	27.09%	616.30%
Total for crop groups listed above:	0.0003708	81.50%	1,853.97%
-----	-----	-----	-----

U.S. Environmental Protection Agency
DEEM89N CHRONIC analysis for METHYL PARATHION
Residue file name: 053501CR
Analysis Date 08-11-1998
R,eference dose (RfD, CHRONIC)

Ver. 6.12
(1989-92 data)
Adjustment factor #2 used.
Residue file dated: 08-11-1998/11:20:46/8
0.000020 mg/kg body-wt/day

Critical Commodity Contribution Analysis for
All infants (<1 year)

Total Exposure 0.0020056 mg/kg-body wt/DAY

Crop groups with total exposure contribution > 10%
Foods/Foodforms with exposure contribution > 10%

Crop group	----- Exposure Analysis -----		
Food	mg/kg	% of Total	Percent
Foodform	body wt/day	Exposure	of RfD

POME FRUITS			
APPLES	0.0002836	14.14%	1,418.13%
APPLES-JUICE-CONCENTRATE	0.0005776	28.80%	2,888.19%

Total for crop group	0.0010100	50.36%	5,049.91%
STONE FRUITS			
PEACHES	0.0004234	21.11%	2,117.14%

Total for crop group	0.0005262	26.24%	2,631.00%
CEREAL GRAINS			
RICE-MILLED (WHITE)	0.0002218	11.06%	1,108.90%

Total for crop group	0.0002525	12.59%	1,262.40%
Total for crop groups listed above:	0.0017887	89.18%	8,943.30%

U.S. Environmental Protection Agency
 DEEM Acute analysis for METHYL PARATHION
 Residue file name: D:\053501ac.R91
 Analysis Date 08-11-1998
 Reference dose (aRfD, Acute) .000025 mg/day
 Comment :uf = 1000

Ver. 6.08
 1989/92 data
 Adjustment factor #2 NOT used.
 Residue file dated: 08-11-1998/11:22:38/8

Food Code	Crop Grp	Food Name	RESIDUE (ppm)	Adj.Factors	
				#1	#2
013	A	GRAPES	003.000000	01.000	01.000
014	A	GRAPES-RAISINS	000.120000	01.000	01.000
015	A	GRAPES-JUICE	000.090000	01.000	01.000
040	R	ALMONDS	000.100000	01.000	01.000
047	R	PECANS	000.100000	01.000	01.000
048	R	WALNUTS	000.100000	01.000	01.000
052	L	APPLES	001.000000	01.000	01.000
053	L	APPLES-DRIED	001.000000	08.000	01.000
054	L	APPLES-JUICE/CIDER	000.100000	01.300	01.000
056	L	PEARS	001.000000	01.000	01.000
057	L	PEARS-DRIED	001.000000	06.250	01.000
061	M	CHERRIES	001.000000	01.000	01.000
062	M	CHERRIES-DRIED	001.000000	04.000	01.000
063	M	CHERRIES-JUICE	001.000000	01.500	01.000
064	M	NECTARINES	001.000000	01.000	01.000
065	M	PEACHES	001.000000	01.000	01.000
066	M	PEACHES-DRIED	001.000000	07.000	01.000
067	M	PLUMS(DAMSONS)	001.000000	01.000	01.000
066	M	PLUMS-PRUNES(DRIED)	001.000000	05.000	01.000
069	M	PLUMS/PRUNE-JUICE	001.000000	01.400	01.000
125	A	HOPS	001.000000	01.000	01.000
159	I	TOMATOES-WHOLE	000.500000	01.000	01.000
160	I	TOMATOES-JUICE	000.0j0000	01.000	01.000
161	I	TOMATOES-PUREE	000.060000	01.000	01.000
162	I	TOMATOES-PASTE	000.060000	01.000	01.000
163	I	TOMATOES-CATSUP	000.030000	01.000	01.000
166	E	CELERY	005.000000	01.000	01.000
168	F	BROCCOLI	001.000000	01.000	01.000
169	F	BRUSSELS SPROUTS	001.000000	01.000	01.000
170	F	CABBAGE-GREEN AND RED	001.000000	01.000	01.000
171	F	CAULIFLOWER	001.000000	01.000	01.000
172	F	COLLARDS	001.000000	01.000	01.000
173	F	CABBAGE-CHINESE/CELERY/BOK CHO	001.000000	01.000	01.000
174	F	KALE	001.000000	01.000	01.000
175	F	KOHLRABI	G01.000000	01.000	01.000
176	E	LETTUCE-LEAFY VARIETIES	002.000000	01.000	01.000
181	A	ARTICHOKES-GLOBE	002.000000	01.000	01.000
182	E	LETTUCE-UNSPECIFIED	002.000000	01.000	01.000
183	F	MUSTARD GREENS	001.000000	01.000	01.000
186	E	SPINACH	000.500000	01.000	01.000
188	C	TURNIPS-TOPS	004.000000	01.000	01.000
192	E	LETTUCE-HEAD VARIETIES	002.000000	01.000	01.000
198	B	CARROTS	001.000000	01.000	01.000
205	D	ONIONS-DRY-BULB (CIPOLLINI)	001.000000	01.000	01.000
206	D	ONIONS-DEHYDRATED OR DRIED	001.000000	09.000	01.000
207	B	POTATOES/WHITE-WHOLE	000.100000	01.000	01.000
208	B	POTATOES/WHITE-UNSPECIFIED	000.100000	01.000	01.000
209	B	POTATOES/WHITE-PEELED	000.100000	01.000	01.000
210	B	POTATOES/WHITE-DRY	000.100000	06.500	01.000
211	B	POTATOES/WHITE-PEEL ONLY	000.100000	01.000	01.000
218	B	SWEET POTATOES (INCL YAMS)	000.100000	01.000	01.000
219	B	TURNIPS-ROOTS	000.100000	01.000	01.000
227	G	BEANS-DRY-GREAT NORTHERN	000.100000	01.000	01.000
228	G	BEANS-DRY-KIDNEY	000.100000	01.000	01.000
229	G	BEANS-DRY-LIMA	000.100000	01.000	01.000
230	G	BEANS-DRY-NAVY (PEA)	000.100000	01.000	01.000
231	G	BEANS-DRY-OTHER	000.100000	01.000	01.000
232	G	BEANS-DRY-PINTO	000.100000	01.000	01.000
233	G	BEANS-SUCCULENT-LIMA.	001.000000	01.000	01.000
234	G	BEANS-SUCCULENT-GREEN	001.000000	01.000	01.000
235	G	BEANS-SUCCULENT-OTHER	001.000000	01.000	01.000
236	G	BEANS-SUCCULENT-YELLOW/WAX	001.000000	01.000	01.000
237	O	CORN/POP	000.200000	01.000	01.000
238	O	CORN/SWEET	000.200000	01.000	01.000
240	G	PEAS (GARDEN)-DRY	000.500000	01.000	01.000

241	G	PEAS (GARDEN)-GREEN	001.000000	01.000	01.000
243	G	LENTILS	000.100000	01.000	01.000
244	G	MUNG, BEANS (SPROUTS)	001.000000	01.000	01.000
249	G	BEANS-DRY-BROADBEANS	000.100000	01.000	01.000
250	G	BEANS-SUCCULENT-BROADBEANS	001.000000	01.000	01.000
251	G	BEANS-DRY-PIGEON BEANS	000.100000	01.000	01.000
253	G	BEANS-UNSPECIFIED	001.000000	01.000	01.000
256	G	BEANS-DRY-HYACINTH	000.100000	01.000	01.000
257	G	BEANS-SUCCULENT-HYACINTH	001.000000	01.000	01.000
258	G	BEANS-DRY-BLACKEYE PEAS/COWPEA	000.100000	01.000	01.000
259	G	BEANS-DRY-GARBANZO/CHICK PEA	000.100000	01.000	01.000
262	D	ONIONS-GREEN	001.000000	01.000	01.000
265	O	BARLEY	004.000000	01.000	01.000
266	O	CORN GRAIN-ENDOSPERM	000.200000	01.000	01.000
267	O	CORN GRAIN-BRAN	000.200000	01.000	01.000
268	O	CORN GRAIN/SUGAR/HFCS	000.200000	01.500	01.000
269	O	OATS	004.000000	01.000	01.000
270	O	RICE-ROUGH (BROWN)	003.000000	01.000	01.000
271	O	RICE-MILLED (WHITE)	003.000000	01.000	01.000
275	O	SORGHUM (INCLUDING MILO)	000.100000	01.000	01.000
276	O	WHEAT-ROUGH	004.000000	01.000	01.000
277	O	WHEAT-GERM	008.000000	01.000	01.000
278	O	WHEAT-BRAN	008.000000	01.000	01.000
279	O	WHEAT-FLOUR	001.600000	01.000	01.000
282	B	SUGAR-BEET	000.100000	01.000	01.000
289	O	CORN GRAIN-OIL	000.200000	01.000	01.000
290	A	COTTONSEED-OIL	003.000000	01.000	01.000
291	A	COTTONSEED-MEAL	001.000000	01.000	01.000
293	A	PEANUTS-OIL	001.000000	01.000	01.000
297	G	SOYBEANS-OIL	000.300000	01.000	01.000
298	A	SUNFLOWER-OIL	000.200000	01.000	01.000
301	A	CANOLA OIL (RAPE SEED OIL)	000.200000	01.000	01.000
303	G	SOYBEAN-OTHER	000.100000	01.000	01.000
304	G	SOYBEANS-MATURE SEEDS DRY	000.100000	01.000	01.000
305	G	SOYBEANS-FLOUR (FULL FAT)	000.100000	01.000	01.000
306	G	SOYBEANS-FLOUR (LOW FAT)	000.100000	01.000	01.000
307	G	SOYBEANS-FLOUR (DEFATTED)	000.100000	01.000	01.000
315	A	GRAPES-WINE AND SHERRY	003.000000	01.000	01.000
377	L	APPLES-JUICE-CONCENTRATE	001.000000	03.900	01.000
384	E	CELERY JUICE	005.000000	01.000	01.000
388	O	CORN GRAIN/SUGAR-MOLASSES	000.200000	01.500	01.000
392	A	GRAPES-JUICE-CONCENTRATE	000.090000	03.600	01.000
399	O	OATS-BRAN	008.000000	01.000	01.000
402	M	PEACHES-JUICE	001.000000	01.000	01.000
403	A	PEANUTS-BUTTER	001.000000	01.890	01.000
404	L	PEARS-JUICE	001.000000	01.000	01.000
405	G	PEAS-SUCCUL./BLACKEYE/COWPEA	001.000000	01.000	01.000
408	O	RICE-BRAN	003.000000	01.000	01.000
417	A	SUNFLOWER-SEEDS	000.200000	01.000	01.000
423	I	TOMATOES-DRIED	000.500000	14.300	01.000
431	R	WALNUT OIL	000.100000	01.000	01.000
437	O	WHEAT-GERM OIL	008.000000	01.000	01.000
482	A	SOYBEANS-PROTEIN ISOLATE	000.100000	01.000	01.000
940	A	PEANUTS-HULLED	001.000000	01.000	01.000

U.S. Environmental Protection Agency
 DEEM ACUTE analysis for METHYL PARATHION (1989-92 data)
 Residue file name: 053501ac.R91 Adjustment factor #2 NOT used.
 Analysis Date: 08-11-1998/11:32:12 Residue file dated: 08-11-1998/11:22:38/8
 Acute Reference Dose (aRfD) 0.000025 mg/kg body-wt/day
 Run Comment: uf = 1000
 U.S. pop - all seasons

	Daily Exposure Analysis 1/ (mg/kg body-weight/day)	
	per Capita	per User
Mean	0.008343	0.008369
Standard Deviation	0.007460	0.007457
Standard Error	0.000039	0.000040
Percent of aRfD	>10,000	>10,000

Percent of Person-Days that are User-Days = 99.69%

Estimated percentile of user-days exceeding calculated exposure in mg/kg body-wt/day and corresponding percent of aRfD

Percentile	Exposure	% aRfD	Percentile	Exposure	% aRfD
90.00	0.002177	8707.30	10.00	0.016922	>10,000
80.00	0.003242	>10,000	5.00	0.022438	>10,000
70.00	0.004219	>10,000	2.50	0.028675	>10,000
60.00	0.005199	>10,000	1.00	0.037632	>10,000
50.00	0.006331	>10,000	0.50	0.044493	>10,000
40.00	0.007648	>10,000	0.25	0.050158	>10,000
30.00	0.009351	>10,000	0.10	0.058126	>10,000
20.00	0.011963	>10,000			

Estimated percentile of per-capita days exceeding calculated exposure in mg/kg body-wt/day and corresponding percent of aRfD

Percentile	Exposure	% aRfD	Percentile	Exposure	% aRfD
90.00	0.002115	8460.93	10.00	0.016907	>10,000
80.00	0.003215	>10,000	5.00	0.022421	>10,000
70.00	0.004198	>10,000	2.50	0.028656	>10,000
60.00	0.005181	>10,000	1.00	0.037613	>10,000
50.00	0.006313	>10,000	0.50	0.044471	>10,000
40.00	0.007632	>10,000	0.25	0.050140	>10,000
30.00	0.009335	>10,000	0.10	0.058109	>10,000
20.00	0.011946	>10,000			

1/ Analysis based on all three-day participant records in CSFII 1989-92 survey.

U.S. Environmental Protection Agency
 DEEM ACUTE analysis for METHYL PARATHION
 Residue file name: 053501ac.R91
 Analysis Date: 08-11-1998/11:32:12
 Acute Reference Dose (aRfD)
 All infants (<1 year)

Ver. 6.27
 (1989-92 data)

Adjustment factor #2 NOT used.

Residue file dated: 08-11-1998/11:22:38/8

0.000025 mg/kg body-wt/day

Daily Exposure Analysis
 (mg/kg body-weight/day)

per Capita per User

Mean	0.017124	0.018986
Standard Deviation	0.020850	0.021134
Standard Error	0.000847	0.000912
Percent of aRfD	>10,000	>10,000

Percent of Person-Days that are User-Days = 90.19%

Estimated percentile of user-days exceeding calculated exposure in mg/kg body-wt/day and corresponding percent of aRfD

Percentile	Exposure	% aRfD	Percentile	Exposure	% aRfD
90.00	0.000675	2701.29	10.00	0.044849	>10,000
80.00	0.000892	3568.99	5.00	0.052719	>10,000
70.00	0.004330	>10,000	2.50	0.059944	>10,000
60.00	0.009378	>10,000	1.00	0.116351	>10,000
50.00	0.014598	>10,000	0.50	0.129992	>10,000
40.00	0.020082	>10,000	0.25	0.141001	>10,000
30.00	0.025040	>10,000	0.10	0.151893	>10,000
20.00	0.031432	>10,000			

Estimated percentile of per-capita days exceeding calculated exposure in mg/kg body-wt/day and corresponding percent of aRfD

Percentile	Exposure	aRfD	Percentile	Exposure	% aRfD
90.00	0.000014	57.56	10.00	0.043390	>10,000
80.00	0.000704	2814.14	5.00	0.051863	>10,000
70.00	0.001713	6652.97	2.50	0.059158	>10,000
60.00	0.006084	>10,000	1.00	0.114117	>10,000
50.00	0.011759	>10,000	0.50	0.128726	>10,000
40.00	0.017696	>10,000	0.25	0.139803	>10,000
30.00	0.023422	>10,000	0.10	0.151103	>10,000
20.00	0.030042	>10,000			

U.S. Environmental Protection Agency Ver. 6.27
 DEEM ACUTE analysis for METHYL PARATHION (1989-92 data)
 Residue file name: 053501ac.R91 Adjustment factor #2 NOT used.
 Analysis Date: 08-11-1998/11:32:12 Residue file dated: 08-11-1998/11:22:38/8
 Acute Reference Dose (aRfD) 0.000025 mg/kg body-wt/day
 Run Comment: uf = 1000

Summary calculations:

	95th Percentile		99th Percentile		99.9 Percentile	
	Exposure	% aRfD	Exposure	% aRfD	Exposure	% aRfD
	-----	-----	-----	-----	-----	-----
U.S. pop - all seasons:	0.022421	>10000	0.037613	>10000	0.058109	>10000
All infants (<1 year):	0.051863	>10000	0.114117	>10000	0.151103	>10000